WE CLAIM:

1. A process for manufacturing composite parts of given thickness, comprising reinforcement fibers which are parallel to at least one preferred direction of reinforcement, said fibers being embedded in a matrix based on a composition comprising a resin which can be hardened by ionizing irradiation, the process comprising the following stages:

- arranging said reinforcement fibers substantially parallel to one plane and impregnating them with said composition;
- exposing the composition containing said fibers, in a layer of thickness less than said given thickness, to ionizing irradiation, in order partially to polymerize the resin and to obtain a precomposite in which said composition is in a solid phase;
- taking lengths from the precomposite and applying them to a support, the surface of which is non-planar in shape, by stacking them on one another in a number dictated by said given thickness, and by causing them to fit snugly against said shape of the support, and thus to create a stack of stressed lengths;
- subjecting the stack to final molding at a suitable pressure and temperature to continue the polymerization of the resin and to join the different lengths of precomposite.

2. A process according to Claim 1, in which the surface of the support is developable.

3. A process according to Claim 1, in which, considering a minimum radius of curvature "r" of said composite part, the start of prepolymerization is effected in a layer of thickness "e" is such that "e" is smaller than r/20.

4. A process according to Claim 1, in which, considering the minimum radius of curvature "r" of said composite part, the start of prepolymerization is effected in a layer of thickness "e" is such that "e" is smaller than r/150.

5. A process according to Claim 1, in which said lengths of precomposite are stacked and deformed individually to make them each fit snugly in succession against said shape of the support.

6. A process according to Claim 1, in which said lengths of precomposite are stacked and deformed in groups of several lengths to make them fit snugly collectively against said shape of the support.

7. A process according to Claim 1, in which the temperature during the molding under pressure in the final molding stage is higher than the glass transition temperature T_g of the composition of the precomposite.

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8. A process according to Claim 1, in which the exposure to ionizing irradiation is stopped once the index $T = T_{gf} - T_{gpr}$, T_{gpr} being the glass transition temperature of the composition of the precomposite and T_{gf} being the glass transition temperature of the composition of the final composite, has become less than 120°C and before said index T has become less than 30°C.

9. A process according to Claim 1, in which the exposure to ionizing irradiation is stopped once the index D constituted by the Shore D hardness of the precomposite divided by the Shore D hardness of the final composite has reached a value of the order of 0.5 and before said index D has reached a value of the order of 0.7.

10. A process according to Claim 1, in which the stage during which said composition is exposed to ionizing irradiation is carried out with oxygen excluded.

11. A process according to Claim 1, in which, during the application of the lengths to said support, stresses are exerted externally on said lengths of precomposite in order to force them to fit snugly against said shape of the support, and said stresses are kept exerted externally at least until the start of the heat treatment stage.

12. A process according to Claim 1, in which the different lengths of the stack are joined temporarily by inserting at least in part a layer of said composition, and by exposing said inserted layer, at least in part, to ionizing irradiation, in order to prepolymerize the resin of said inserted layer.

13. A process according to Claim 1, in which the different lengths of the stack are joined temporarily by subjecting the stack to pre-molding at a suitable pressure and temperature in order to continue the polymerization of the resin, at least in part, before any other intermediate stages and before the final molding.

14. A process according to Claim 1, in which the different lengths of the stack are joined temporarily by inserting a temporary holding layer comprising essentially a high-viscosity composition.

15. A process according to Claim 1, in which the viscosity of said composition is adjusted, during the stage of impregnation of the fibers, by increasing the temperature of said composition.

16. A process according to Claim 1, in which the resin is selected from the group consisting of unsaturated vinylester resins and polyester resins.

17. A process according to Claim 1, in which the resin is an epoxy resin.

18. A process according to Claim 16, in which said composition comprises a monomer which can be copolymerized with the resin and the viscosity of said composition is adjusted by varying the proportion of monomer.

19. A process according to Claim 18, in which said monomer is stirene.

20. A process according to Claim 1, in which said composition comprises a polymerization photoinitiator and the irradiation lies within the visible ultraviolet spectrum.

21. A process according to Claim 16, in which said composition comprises a polymerization photoinitiator which is bis(2,4,6-trimethylbenzoyl)-phenylphosphine oxide and the irradiation lies within the visible ultraviolet spectrum.

22. A process according to Claim 1, in which the reinforcement fibers are selected from the group comprising high-tenacity polyacrylic fibers, oxidized polyacrylonitrile fibers, high-tenacity polyvinyl alcohol fibers, aromatic polyamide fibers, polyamide-imide fibers, polyimide fibers, chlorofibers, high-tenacity polyester fibers, aromatic polyester fibers, high-tenacity polyethylene fibers, high-tenacity polypropylene fibers, cellulose fibers, rayon fibers, high-tenacity viscose fibers, polyphenylene benzobisoxazol fibers, polyethylene naphthenate fibers, glass fibers, carbon fibers, silica fibers and ceramic fibers.

23. A process according to Claim 20, in which a glass fiber is used.

24. A process according to Claim 1, in which a layer of composition based on sulphur-vulcanizable elastomer is interposed between some of the lengths of precomposite.

25. A process according to Claim 24 in which, on the surface of each length intended to receive a layer of composition based on sulphur-vulcanizable elastomer, there is deposited a layer of resorcinol formaldehyde latex glue (RFL), said layer of RFL glue being dried without reaching a temperature of greater than 100°C, before receiving said layer of composition based on sulphur-vulcanizable elastomer.

26. A process according to Claim 24, including, in the final molding stage, joining the layers of the stack, vulcanizing the composition based on sulphur-vulcanizable elastomer, polymerizing completely the resin and joining the composition based on sulphur-vulcanizable elastomer and the resin.

27. A process according to Claim 1, using unidirectional fibers parallel to the said at least one preferred direction of reinforcement, arranged substantially parallel during impregnation by said composition.

28. A stratified composite material of non-planar form, comprising reinforcement fibers parallel to at least one preferred direction of reinforcement, each fiber being entirely contained in a single stratum, said fibers being embedded in a matrix based on a composition comprising a resin which can be hardened by ionizing irradiation,

in which each stratum is of a thickness of less than 0.3 millimeters, in which the glass transition temperature T_g of the matrix is greater than 150°C, and in which the Shore D hardness of the material is greater than 80.

29. A material according to Claim 28, in which the surface of each stratum is of non-planar, developable form.

30. A material according to Claim 28, in which the modulus of flexure is greater than 30000 MPa, the breaking stress upon flexure is greater than 1000 MPa, and the breaking stress under shear is greater than 70 MPa.

31. A material according to Claim 28, in which the resin is selected from the group consisting of unsaturated vinylester resins and polyester resins.

32. A material according to Claim 28, in which the resin is an epoxy resin.

33. A material according to Claim 31, in which said composition comprises a monomer which can be copolymerized with the resin.

34. A material according to Claim 33, in which said monomer is stirene.

35. A material according to Claim 28, in which said composition comprises a polymerization photoinitiator and the irradiation lies within the visible ultraviolet spectrum.

36. A material according to Claim 28, in which said composition comprises a polymerization photoinitiator which is bis(2,4,6-trimethylbenzoyl)-phenylphosphine oxide and the irradiation lies within the visible ultraviolet spectrum.

37. A material according to Claim 28, in which the reinforcement fibers are selected from the group consisting of glass fibers and carbon fibers.

38. A material according to Claim 28, in which, between at least some of said strata, there is interposed a layer of composition based on sulphur-vulcanizable elastomer.

39. A material according to Claim 38, in which, between at least some of said strata and said layer of composition based on sulphur-vulcanizable elastomer, there is interposed a layer of resorcinol formaldehyde latex glue (RFL).

40. A material according to Claim 28, in which the reinforcement fibers are unidirectional fibers.

41. A precomposite prepared in a great length and in a width of less than 0.3 millimeters, comprising reinforcement fibers which are parallel to at least one preferred direction of reinforcement, said fibers being embedded in a matrix based on a composition comprising a resin which can be hardened by ionizing irradiation, in which the glass transition temperature T_g of the matrix is between 40°C and 130°C, and in which the Shore D hardness of this precomposite is between 50 and 65, coated with a protective film opaque to visible ultraviolet irradiation.

42. A precomposite according to Claim 41, in which the resin is selected from the group consisting of unsaturated vinylester resins and polyester resins.

43. A precomposite according to Claim 41, in which the resin is an epoxy resin.

44. A precomposite according to Claim 42, in which said composition comprises a monomer which can be copolymerized with the resin.

45. A precomposite according to Claim 44, in which said monomer is stirene.

46. A precomposite according to Claim 41, in which said composition comprises a polymerization photoinitiator and the irradiation lies within the visible ultraviolet spectrum, and in which the coating is opaque to visible ultraviolet irradiation.

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47. A precomposite according to Claim 42, in which said composition comprises a polymerization photoinitiator which is bis(2,4,6-trimethylbenzoyl)-phenylphosphine oxide and the irradiation lies within the visible ultraviolet spectrum.

48. A precomposite according to Claim 41, in which the reinforcement fibers are selected from the group consisting of glass fibers and carbon fibers.

49. A precomposite according to Claim 41, in which the reinforcement fibers are unidirectional fibers.